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Job No: CTCE/BBMP/W.No.18/KRIDL/BM/Sp_Wa/2015-16 28.08.2015

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Hebbal Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (East),** KRIDL, Bangalore.
Name of the Work	Providing asphalting to SWD Parallel Road to Balance work of BWSSB in Ward No.18, BBMP, Bangalore.
Reference	AEE(Hebbal)/PR/352/2015-16 Dated: 20.08.2015
Source / Location	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	28.08.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 2	
1	Weight of aggregate suspended in water with the basket	W_1 g	2015	2012	2014	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_3$ g	1265	1262	1264	
4	Weight of saturated surface dry aggregate in air	W_3 g	2021	2023	2020	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_5)$ g	756	761	756	
6	Weight of oven dried aggregate	W_4 g	2006	2009	2005	
7	Specific Gravity	$W_4/(W_3-W_5)$	2.653	2.640	2.652	2.653
8	Apparent Specific gravity	$W_4/(W_4-W_5)$	2.707	2.689	2.706	2.706
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.75%	0.70%	0.75%	0.75%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Macadam is 2.0%

Note:

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Job No: CTCE/BBMP/W.No.18/KRIDL/BM/Agg.G/2015-16 28.08.2015

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Hebbal Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (East),** KRIDL, Bangalore.
Name of the work	Providing asphalting to SWD Parallel Road to Balance work of BWSSB in Ward No.18, BBMP, Bangalore.
Reference	AEE(Hebbal)/PR/352/2015-16 Dated: 20.08.2015
Sample ID	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	28.08.2015

Total Weight of Sample: 5150 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	253	4.91	4.91	95.09	90-100	
13.2	1565	30.39	35.30	64.70	56-88	
4.75	1740	33.79	69.09	30.91	16-36	
2.36	865	16.80	85.88	14.12	4-19	
0.3	347	6.74	92.62	7.38	2-10	
0.075	223	4.33	96.95	3.05	0-8	

Total Weight of Sample: 5250 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	336	6.40	6.40	93.60	90-100	
13.2	1615	30.76	37.16	62.84	56-88	
4.75	1720	32.76	69.92	30.08	16-36	
2.36	915	17.43	87.35	12.65	4-19	
0.3	396	7.54	94.90	5.10	2-10	
0.075	142	2.70	97.60	2.40	0-8	

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T-2377

Job No.: CTCE/BBMP/W.No.18/KRIDL/CSR-08/931d/QB(SDBC)/2015-16 27.08.2015

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer**, Hebbal Sub Division, BBMP, Bangalore.
*AGENCY	:	**Technical Manager (East),** KRIDL., Bangalore.
*NAME OF THE WORK	:	Providing asphalting to SWD Parallel Road to Balance work of BWSSB in Ward No.18, BBMP, Bangalore.
REFERENCE	:	AEE(Hebbal)/PR/352/2015-16 Dated: 20.08.2015
SAMPLE ID	:	Bitumen
DATE OF SAMPLING		25.08.2015
DATE OF TESTING	:	27.08.2015

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2006
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	94	80 to 100
2	Softening point, °C	IS :1205 -1978 (RA-2009)	44	Min. 40
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	290	Min. 220

*Information furnished by the Customer/Representative

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Job No.: CTCE/BBMP/W.No.18/KRIDL/SDBC/AIV/2015-16 27.08.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Hebbal Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (East),** KRIDL, Bangalore.
Name of the Work	Providing asphalting to SWD Parallel Road to Balance work of BWSSB in Ward No.18, BBMP, Bangalore.
Reference	AEE(Hebbal)/PR/352/2015-16 Dated: 20.08.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	27.08.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	384	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	88	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	298	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	22.14	22.80	22.47

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No: CTCE/BBMP/W.No.18/KRIDL/SDBC/Shape_T/2015-16 : 27.08.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Hebbal Sub Division, BBMP, Bangalore.
Agency	: **Technical Manager (East),** KRIDL, Bangalore.
Name of Work	: Providing asphalting to SWD Parallel Road to Balance work of BWSSB in Ward No.18, BBMP, Bangalore.
Reference	: AEE(Hebbal)/PR/352/2015-16 Dated: 20.08.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Semi Dense Bituminous Concrete
Date of Testing	: 27.08.2015

Result : Flakiness Index = **12.36%**

Elongation Index = **13.85%**

Result : Combined Flakiness & Elongation index **26.21%**

Comments:

Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No. CTCE/BBMP/W.No.18/KRIDL/SDBC/Stripping/2015-16 28.08.2015

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Hebbal Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (East),** KRIDL, Bangalore.
Name of the work	Providing asphalting to SWD Parallel Road to Balance work of BWSSB in Ward No.18, BBMP, Bangalore.
Reference	AEE(Hebbal)/PR/352/2015-16 Dated: 20.08.2015
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	28.08.2015

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.23	96.77
2	3.1		
3	3.4		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95 %

Note:

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Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Hebbal Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (East),** KRIDL, Bangalore.
Name of the Work	Providing asphalting to SWD Parallel Road to Balance work of BWSSB in Ward No.18, BBMP, Bangalore.
Reference	AEE(Hebbal)/PR/352/2015-16 Dated: 20.08.2015
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	28.08.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2024	2026	2025	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_3$ g	1269	1271	1270	
4	Weight of saturated surface dry aggregate in air	W_3 g	2015	2013	2011	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_4)$ g	746	742	741	
6	Weight of oven dried aggregate	W_4 g	1998	1995	1997	
7	Specific Gravity	$W_4/(W_3-W_5)$	2.678	2.689	2.695	2.687
8	Apparent Specific gravity	$W_4/(W_4-W_5)$	2.741	2.756	2.747	2.748
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.85%	0.90%	0.70%	0.82%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.18/KRIDL/SDBC/AGG/2015-16 28.08.2015

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Hebbal Sub Division, BBMP, Bangalore.
Agency	**Technical Manager (East),** KRIDL, Bangalore.
Name of the Work	Providing asphalting to SWD Parallel Road to Balance work of BWSSB in Ward No.18, BBMP, Bangalore.
Reference	AEE(Hebbal)/PR/352/2015-16 Dated: 20.08.2015
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	28.08.2015

Total Weight of Sample: 5150 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	317	6.2	6.16	93.84	90-100	
4.75	2650	51.5	57.61	42.39	35-51	
2.36	735	14.3	71.88	28.12	24-39	
1.18	485	9.4	81.30	18.70	15-30	
0.3	330	6.4	87.71	12.29	9-19	
0.075	345	6.7	94.41	5.59	3-8	

Total Weight of Sample: 5200 gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	390	7.5	7.50	92.50	90-100	
4.75	2555	49.1	56.63	43.37	35-51	
2.36	875	16.8	73.46	26.54	24-39	
1.18	510	9.8	83.27	16.73	15-30	
0.3	250	4.8	88.08	11.92	9-19	
0.075	265	5.1	93.17	6.83	3-8	

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Job No : CTCE/BBMP/W.No.18/KRIDL/SDBC/Stability/2015-16 28.08.2015

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer**, Hebbal Sub Division, BBMP, Bangalore.
Agency	:	**Technical Manager (East),** KRIDL, Bangalore.
Name of the work	:	Providing asphalting to SWD Parallel Road to Balance work of BWSSB in Ward No.18, BBMP, Bangalore.
Reference	:	AEE(Hebbal)/PR/352/2015-16 Dated: 20.08.2015
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Semi Dense Bituminous Concrete
Date of Testing	:	28.08.2015

The results of the tests conducted on the bituminous mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, at 60° C, Kn	10.35	10.50	8.2 Kn (min)
2	Marshal flow at 60° C, mm	2.50	2.65	2 – 4
3	Percent air voids	3.25	4.15	3 – 5
4	Percent voids in mineral aggregates (VMA %)	14.15	14.30	13 - 15
5	Percent voids filled with Bitumen (VFB %)	72.75	72.40	65 – 78
6	Density, g/cc	2.26	2.27	---

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